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ABSTRACT

This study was conducted in the school district of Asbury Park, New Jersey, and was designed to determine the attitudes of students and teachers towards sex-role stereotyping in career preferences which employ mathematical skills. Control and experimental classes of students in grades three through eight were selected. Pretests were given to both students and teachers in both groups on mathematical attitudes and occupational preference. Also used were mathematics achievement scores of the students. Two workshops were held by the researchers with participating teachers to increase teacher career awareness. Posttesting of the experimental students and teachers revealed an improvement in the achievement and attitudes of pupils and improvement in attitude of instructors toward mathematics as well as an increased awareness of non-stereotyped career preferences. One recommendation suggested that the Curriculum Committee for the district examine the research and adopt it as part of the mathematics curriculum each semester. (MP)

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EXPANDING CAREER CHOICES FOR STUDENTS BY REDUCING MATHEMATICS ANXIETY

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INTRODUCTION

A study of control and experimental classes in grades three to eight was conducted in an urban school district. The purpose of the study was to determine the attitudes of students and teachers towards sex role stereotyping in career preferences which employ mathematical ability skills.

PROCEDURE

The evaluation was made by selecting one control and one experimental class in grades three through eight. Pre and post questionnaires were administered to students and teachers in the experimental groups. The instrument used to measure teacher attitudes toward mathematics was devised by the researchers and consisted of ten positive and ten negative statements. A three point scale of 0 to 2 of "Agree", "Uncertain", and "Disagree" was used. Reverse weighting was given for positive and negative statements. A sampling of the statements in the questionnaire concerned: interest in mathematics, security in teaching mathematics, enjoyment in taking mathematics courses, dislike for mathematics and fear of mathematics. The instrument to measure student attitude toward mathematics was obtained from Psychologist and

Educators, Inc. The instrument (Arlin-Hills Attitude Towards Mathematics) although the same for each grade did account for differences in reading levels. A four point scale in the instrument was "No", "Sometimes", "Usually", and "Yes". For scoring, a weight of 0 through 3 was used depending on whether the statement was positive or negative. The students were instructed to respond to the statements according to their feelings and were informed that the teacher would not see the responses. A sampling of some statements includes: "Working with numbers is fun", "Working with numbers is boring", and "Working with numbers is an easy subject".

Another instrument was obtained from the New Jersey State Department of Education and was selected to measure students' and teachers' values as to sex appropriateness towards occupations. It used a three point scale that included the categories of "Both", "Female", and "Male". Fifty-one occupational titles from the professional to the unskilled were listed. A sampling of the occupations listed in the instruments includes: architect, judge, pilot, artist, baker, chemist and chauffeur. Two types of scoring were used to evaluate the responses. The first was a total count of each of the check-off columns of "Both", "Female", and "Male". The second was a weighted average of 3, 2, 1 for each column heading.

Used also in this research project were mathematics achievement scores of the students. These tests (California Test of Basic Skills) were administered by the teachers at the beginning and end of the school year of 1978-1979. Demographic data on the teachers were also collected and evaluated, such as highest degree held, source of highest degree, years of service and tenure. School district statistics such as enrollment, free lunches, ethnicity abd number of graduates were also collected.

The researchers conducted two workshops for the six teachers of the experimental group. The first workshop consisted of a slide and cassette presentation with intermittent discussion. The presentation was entitled Help Wanted: Sexism in Career Education Material Part One and prepared by Women on Words and Images, Inc. of Princeton, New Jersey. The thrust of the slide presentation was to explain that career education materials are shown in stereotyped ways. The second workshop was a slide presentation that was designed to generate ideas for unit topics. The slide presentation with accompanying comments was entitled Women at Work: Choice and Challenge Part Two. At this workshop ideas were elicited from the teachers to be incorporated in a weekly unit plan designed by the researchers to increase awareness of careers which employ mathematical skills and

abilities. These units were then taught by each teacher in the experimental classes under the supervision of the researchers.

FINDINGS

The school district, as of September 1978, had a student enrollment of 3,442 students which was almost equally divided between males and females. The number of students in grades one through eight totaled 2,218. The school district is in an urban area with a student population from a deprived socio-economic background. Seventy-one percent of the students are receiving free lunches. Approximately 3 percent of the students drop out each year. Seventy-two percent of the enrollment is comprised of Black students, 21 percent are Caucasions and 7 percent are Hispanic.

The six teachers in the experimental group ranged in age from 23 to 34, with most in the higher age level. For the most part they attended local state colleges. Three hold a degree at the master's level. On the other hand, the six control teachers in the study were generally older and had more years of teaching experience. Most of them attended state and local colleges. The highest degree held by these teachers was a bachelor's degree.

In the pre-testing of both the control and experimental

teacher groups in the area of mathematical attitudes, the control teachers in grades four through seven generally tended to have a more favorable attitude toward mathematics. In the Occupational Preference Questionnaire both groups, control and experimental, were of the opinion that most occupations listed could be performed by either males or females.

Pre-testing of the students in the control group and the experimental group clearly reveals that both groups have interest in mathematics as shown by the majority who had a score above 25 in the Arlin-Hills Attitude Survey. The scores in the Occupational Preference Questionnaire pre-testing showed high student awareness that both males or females could perform the occupations listed. However, many occupations were stereotyped for "male only" by both male and female students.

Pre-testing and post-testing of the experimental student group revealed that in the Arlin-Hills Mathematics Attitude Survey there were no significant changes. Both male and female students had a norm score of 30 or above indicating their interest in mathematics. In the Occupational Preference Questionnaire the post-testing of the experimental students showed, for the most part, increased awareness that either males or females could perform the occupations listed. Generally the results of the Comprehensive Tests of Basic

Skills in Mathematical Achievement showed large increases in the post-test scores over pre-test scores for the experimental classes.

In the post-testing of the experimental teachers, in the Arlin-Hills Survey, five of the six participants showed improvement in their attitude toward mathematics by increases over the norm of 30. The majority of the participating six teachers were of the opinion in the pre and post Occupational Preference Questionnaire that males or females could perform the occupations listed; in some few cases the bias was toward the male.

CONCLUSIONS

The data collected from the study revealed the experimental students improved in achievement and attitudes towards mathematics as well as in awareness of non-stereotyped career preferences.

RECOMMENDATIONS

It was recommended that a Curriculum Committee in the school district examine the study and adopt it as part of the mathematics curriculum each semester. In place of fragmented, separate lists of courses and supervisors in their specialties, it is recommended that a coherent career program be incorporated in the curriculum. It is further recommended that teacher workshops on career curriculum

be continued so that current topics are discussed and incorporated in teaching the subject matter. In addition, teachers should meet periodically in discussion groups with supervisors for the exchange of innovative teaching strategies and ideas which use an interdisciplinary approach to career education.

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